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(71) Applicant and
(72) Inventor: RASMUSSEN, Henning, Baltzer [DK/DK]; Danas Allé 11, DK-8700 Horsens (DK).

(74) Agent: PATRADE A/S; Fredens Torv 3A, DK-8000 Århus C (DK).

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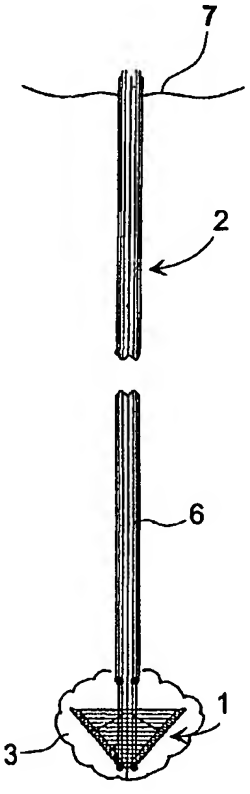
(54) Title: REINFORCEMENT UNIT FO REINFORCING A FOOTING ELEMENT WHEN LAYING PILE FOUNDATIONS WITH A FOUNDATION PILE, AND METHOD FOR PLACING A FOUNDATION PILE AND REINFORCEMENT OF A FOOTING ELEMENT



(57) Abstract: The invention concerns a reinforcement unit for reinforcing a footing element by laying pile foundation with a foundation pile with at least one through-going longitudinal cavity, where the reinforcement unit includes a number of shaped and articulated reinforcement members that are pivotably connected to a centrally arranged, annular element, so that the reinforcement unit has a folded mounting and an extended position of use, and that the reinforcement unit is connected to the foundation pile by one or more tension members. The invention also concerns a method for placing a foundation pile and reinforcing a footing element with a reinforcement unit.

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Reinforcement Unit for Reinforcing a Footing Element when Laying Pile Foundations with a Foundation Pile, and Method for Placing a Foundation Pile and Reinforcement of a Footing Element

Field of the Invention

The present invention concerns a reinforcement unit for reinforcing a footing element when laying pile foundations with a foundation pile with at least one through-going longitudinal cavity and a foundation pile with a footing element reinforced with a reinforcement unit that include at least one through-going longitudinal cavity.

The invention also concerns a method for placing a foundation pile and reinforcing a footing element with a reinforcement unit.

Background of the Invention

By founding large constructions as e.g. houses, walls, tower elements, and similar building structures, typically a foundation supported by a number of foundation piles is used, where the piles are placed in the ground for supporting the foundation and for absorbing the compressing and tensile forces caused by the constructions due to their dead weight and wind load.

For absorbing the compressive forces, typically smooth foundation piles are used that are driven down into the earth until they hit a firm substratum. This implies that in some places, many meters of foundation pile is to be used before the bottom reaches a firm bed. Therefore, it may be a very expensive way of founding a building construction on.

By founding in areas where earth surveys show that there is far down to a firm bed, another type of foundation pile is used, where the foundation pile is provided at its lower end with a footing element having a diameter larger than the diameter of the foundation pile itself. This means that the foundation pile is provided a large area over which the pressure is distributed, and that the footing element makes it more difficult for the pressure caused by the dead weight of the building structures to press the foundation pile farther down into the ground.

Since it is not possible to drive down a foundation pile with enlarged footing element or to press such a foundation pile down through a pre-drilled hole, different solutions have been found as to how the foundation pile is disposed in the desired position before the enlarged reinforcement unit is produced.

Such a foundation pile is known from US 3,832,859 where a foundation pile has a reinforcement unit designed so that by driving down it may spread a number of legs out into the earth layer, after which the pile foot may be cast for formation of a footing element with a dimension greater than the diameter of the foundation pile.

A drawback by using either smooth foundation poles or foundation piles with enlarged footing elements compared with the outer periphery of the foundation pile as described in US 3,832,859 is that these foundation piles are not suited for absorbing tensile forces.

These tensile forces arise when a building section or a tower element is e.g. subjected to wind forces, whereby the foundation piles in the lee side will be exposed to compressive forces while the foundation piles to windward will be exposed to tensile forces.

If the foundation piles can absorb tensile forces, it is an advantage that the foundation piles longitudinally have one or more beads and/or a footing element, which have greater diameter than the foundation pile itself, at one or more points. The increased diameter of the beads/footing element compared with the foundation pile implies that the foundation pile may absorb larger tensile forces than a smooth foundation pile, as the beads/footing element are acted on by the mass of earth that is distributed in an upwards directed conical shape above the beads/footing element.

By using smooth foundation piles, these will only absorb tensile forces provided by the suction of the earth. This suction appears when a foundation pile, due to the resisting force between the surrounding earth layer and the surface of the foundation pile, is